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DE 197 16 051 A 1

~~Application disclosed with the consent of the applicant according to § 31 Par. 2 Sect. 1 Patent Act~~(71) Applicant:
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District, Germany(72) Inventor:
Anonymity requested

(54) Resorbable, screw-on luxation retaining ring for socket components of hip prostheses

(57) Dislocation (luxation) of an artificial hip joint is one of the most frequent early complications after provision with a hip prosthesis. The resorbable luxation securing ring (A), made of the material PLLA (poly-L lactic acid), prevents dislocation during the healing phase, and is transformed into yielding connective tissue, which reduces the risk of a luxation also over the long term. That eliminates the risk of a material failure or a restriction of mobility in the hip joint, as would exist in the case of a non-resorbable substance.

[See original for diagram.]

The luxation retaining ring is screwed onto the edge of the socket component (B) with three also resorbable screws (C) (PLLA), and surrounds the prosthesis head (E) in such a way that the latter is captured by it in the socket. The luxation retaining ring has corresponding prepared bored holes (G) to receive the screws. Ring and screws are made of PLLA (poly-L lactic acid). The ring is made in thicknesses of 1/2 and 1 cm, corresponding to the dimensions of the particular socket edge. The ring covers the edge of the socket (B) with a 210-degree cutout, and thus can be placed as desired to meet all requirements.

The resorbable luxation retaining ring, made of the material PLLA (poly-L lactic acid), is suitable for all common commercial hip prosthesis socket components and socket inlays made of plastic with a wall thickness of at least 0.5 cm.

The following information is taken from documents submitted by the applicant.

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Description

The invention concerns an add-on ring of PLLA (poly-L lactic acid) which is placed on the edge of socket components of hip prostheses made of plastic, using screws that are also made of PLLA.

With conventional socket components of hip prostheses which are installed in the pelvis (D), there is the danger that dislocation of the prosthesis head (E) from the socket (B) may occur. On the other hand, the luxation retaining ring surrounds the femoral head after the latter is placed in the socket and is kept in place by the screws and by way of a rounding that follows the curvature of the particular socket component or inlay. That prevents dislocation. In hip prostheses, the prosthesis head is usually anchored in the femur (F) through the prosthesis shaft. While other models of socket components or inlays of hip sockets made of a single piece sometimes have an edge that surrounds the prosthesis head (so-called snap sockets), they are for exactly that reason in significantly greater danger of becoming loose in their anchoring in the pelvis (D) because of the constant absorption of pressure during movements.

The resorbable material PLLA on the one hand eliminates the danger of a material failure (loosening/breaking of the screws or shearing of the socket ring when the prosthesis head frequently strikes the edge). On the other hand, after about 6 weeks the ring and attaching screws are transformed into flexible native connecting tissue, which provides protection against dislocations, for example in accidents or falls, even long-term.

Look-up location for PLLA: Clinical Orthopaedics and Related Research, 298, pp. 227-285, (1994), H. Pihlajamäki, O. Böstman, M. Manninen: Absorbable Plugs of Self-Reinforced Poly-L-Lactic-Acid in the Internal Fixation of Rabbit Distal Femoral Osteotomies.

The luxation retaining ring (A) includes a 210-degree circular cutout, making it possible to be fixed on the edge of a plastic socket component (B) as desired and depending on the direction of dislocation at risk. To that end it has pre-bored holes (G) to receive Phillips screws (C) with sunken heads. The ring runs out gently toward both ends, so that no step formation occurs toward the margin of the plastic socket.

The luxation retaining ring of resorbable PLLA constitutes a significant improvement over the available socket components of hip prostheses in that the risk of the typical complication of a dislocation is reduced. The resorbability and transformation into flexible native connecting tissue also results in long-term protection against dislocations, without that foreign materials of the ring remain in the body, which otherwise could fail with constant use because of their rigidity.

Description of the drawings

Figure 1: Section through the artificial hip joint with luxation retaining ring in the transverse axis of the body

Figure 2: Enlarged cutout of Figure 1 with screw inserted

Figure 3: Side view of socket component with luxation retaining ring in position

Figure 4: Top view of socket component with luxation retaining ring in position

The meanings of the reference letters are:

- A luxation retaining ring
- B socket component
- C screws
- D pelvis
- E prosthesis head
- F femur
- G bored holes in the ring

Claims

1. A luxation retaining ring for socket components of hip prostheses or inlays thereof made of plastic, characterized by the fact that the luxation retaining ring (A) extends the particular socket rounding and curvature and hence surrounds the artificial femoral head. The luxation retaining ring is fixed on the socket component (B) or the inlay made of plastic with screws (C) and has corresponding bored holes (G) for that purpose.

2. The luxation retaining ring as recited in Claim 1, characterized by the fact that the luxation retaining ring consists of a 210-degree cutout. The ring tapers downward toward the ends, so that no step formation occurs toward the socket component.

3. The luxation retaining ring as recited in Claim 1 or 2, characterized by the fact that luxation retaining ring and attaching screws are made of PLLA (poly-L-lactic acid), which are resorbed after about 6 weeks and transformed into connective tissue.

4. The luxation retaining ring as recited in one of Claims 1 or 2 or 3, characterized by the fact that the luxation retaining ring exists in thicknesses of $\frac{1}{2}$ cm and 1 cm.

Accompanied by 1 page(s) of drawings

PCT/US 03/10950		
A. CLASSIFICATION OF SUBJECT MATTER IPC 7 A61F2/32 A61F2/34 A61F2/30		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELD OF SEARCH Minimum documentation searched (classification system followed by classification symbols) IPC 7 A61F A61L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	DE 197 16 851 A (KUEBER DIETRICH DR MED) 13 November 1997 (1997-11-13) the whole document	1-5,27, 28 5,7-15, 17,21, 29-35
Y	US 5 735 961 A (BAEGE ROLAND ET AL) 7 April 1998 (1998-04-07) column 2, line 66 - column 3, line 9	5,17,21
Y	DE 32 80 340 A (HOMMEDICA INT INC) 23 September 1982 (1982-09-23) page 6, paragraph 2 page 10, paragraph 2 - page 11, paragraph 1 figure 1	7-15, 29-35
----- -/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.		<input checked="" type="checkbox"/> Patent family members are listed in annex.
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubt on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" documents relating to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to underline the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "Z" document member of the same patent family		
Date of the actual completion of the international search 23 July 2003		Date of mailing of the international search report 10.12.03
Name and mailing address of the ISA European Patent Office, P.O. 5518 Patentplan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-3040, Tx 31 651 epo nl Fax: (+31-70) 340-3018		Authorized officer Buchmann, G.

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INT JATION SEARCH REPORT

International Patent No.
PCT/US 03/10950

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02 09615 A (BURROUGHS BRIAN R ; HARRIS WILLIAM H (US); HOFFEL DANIEL P. (US); M) 7 February 2002 (2002-02-07) page 14, line 17 - page 15, line 28 -----	7-18, 12-14, 29-32, 34, 35
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INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US 03/18950**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 98-103
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-38

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1999)

International Application No. PCT/US 03/10950

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 218

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-38

A prosthetic constraining device for, or in combination with, a hip joint, comprising a ring for maintaining the ball joint coupling wherein the ring is made from a biologic and/or reabsorbable material.

2. claims: 39-52, 79-89

A prosthetic constraining device for use with a hip joint, comprising an arcuate body with a central opening wherein the distal surface of the arcuate body has a depression extending radially thereacross, and the proximal surface is adapted to be mounted to an acetabular prosthesis or natural bone.

3. claims: 53-78, 104-108

A constraining device for maintaining engagement of a prosthetic hip joint made from a biologic and/or absorbable material.

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.1

Claims Nos.: 90-103

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Information

Patent No

PCT/US 03/10950

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